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10/725,021	12/02/2003	Sang-Woo Kim	DPO-0008	4730
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FLESHNER & KIM, LLP P.O. BOX 221200 CHANTILLY, VA 20153			EXAMINER BOATENG, ALEXIS ASIEDUA	
			ART UNIT	PAPER NUMBER
			2838	

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/725,021

**Applicant(s)**

KIM ET AL.

**Examiner**

Alexis Boateng

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. Figures 1 - 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities: In paragraph 0031 of the disclosure, the word alternatively is used. The word alternatively is defined as a choice between two mutually exclusive possibilities. The examiner suggests that the correct word for the sentence is alternately, which is defined as to do or execute by turns. This shows that the batteries are charged one after another as the charging of one battery has been stopped.

Appropriate correction is required.

### ***Claim Objections***

3. Claim 25 is objected to because of the following informalities: The word alternatively is used. The word alternatively is defined as a choice between two mutually exclusive possibilities. The examiner suggests that the correct word for the sentence is alternately, which is defined as to do or execute by turns. This shows that the batteries are charged

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one after another as the charging of one battery has been stopped. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite in claim 19, on 4 – 5 recite that that the charging current it is not more than 100mA to 200mA. This claim is an omnibus type claim. Since these values contradict on another, it is not clear what value is being claimed For examination purposes, the charging current is interpreted to be “not less than 200mA.”

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 3, and 14 rejected under 35 U.S.C. 102(b) as being anticipated by Kaite (U.S. 5,808,442).

**Regarding claim 1**, Kaite discloses a method a charging a method of charging a plurality of batteries comprising:

charging a first battery with a constant current until a voltage of said first battery becomes greater than a reference voltage (figure 2 items 1 and 2 and figure 3 item 2);

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charging a second battery with a constant current until a voltage of said second battery becomes greater than a reference voltage (figure 2 item 2 and figure 3 item 2);

resuming charging of said first battery until one of a charging current is less than a reference current and the charging current is less than a limit current indicating a state of full charge (column 2 lines 55 thru 58);

resuming charging of said second battery until one of a charging current is less than a reference current and the charging current is less than a limit current indicating a state of full charge (column 2 lines 55 thru 58);

**Regarding claim 2**, wherein said reference voltage is between approximately 70% and approximately 80% of full charging voltage (column 2 lines 55 thru 58).

**Regarding claim 3**, wherein said reference current is a current value at a time of approximately 80% of full charging voltage (column 2 lines 55 thru 58).

**Regarding claim 14**, Kaite discloses identifying a charging voltage/current characteristic of at least one of the plurality of batteries; (column 1 line 66 thru column 2 lines 1 thru 7);

charging the first battery based on a first charging voltage/current characteristic of said first battery (column 7 lines 36 thru 40);

charging the second battery based on a first charging voltage/current characteristic of said second battery (column 7 lines 42 thru 46);

stopping charging of the first battery based on a second charging voltage/current characteristic of said first battery (column 2 lines 19 thru 23);

complete charging of one of the first battery and the second battery based on the voltage/current characteristic of said one of the first battery and the second battery (column 7 lines 48 thru 51).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 5 - 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyamada (U.S. 4,387,332) in view Fujii (U.S. 6,160,377).

**Regarding claim 5**, Oyamada discloses a method of charging a plurality of batteries comprising (column 1 lines 7 thru 11):

alternatively charging each of a plurality of batteries (column 1 lines 67 and 68 and column 2 lines 1 and 2) until a charging voltage of each of said plurality of batteries becomes a reference voltage (column 2 lines 15 thru 22). Oyamada discloses the invention as defined, but does not disclose wherein resuming charging the first battery until a charging current of the first battery is less than a reference current; and further resuming charging of the battery until said charging current of the first battery is less than a limit current indicating a full state of charge. Fujii discloses in column 11 lines 20 thru 51 that the battery is continuously charging until it reaches a charging current ratio of 90%. Fujii further discloses in column 11 lines 52 thru 57, that the controller uses this percentage of charging current to determine

when to stop charging the battery. At the time of invention, it would have been obvious to a person of ordinary skill in the art to design the battery charger to cease charging when the charging current becomes lower than a predetermined value so that it does not overcharge and destroy the battery.

**Regarding claim 6,** Oyamada does not disclose resuming charging of the second battery until a charging current of the second battery is less than a reference current. Fujii discloses in column 11 lines 20 thru 51 that the battery is continuously charging until it reaches a charging current ratio of 90%. Fujii further discloses in column 11 lines 52 thru 57, that the controller uses this percentage of charging current to determine when to stop charging the battery. At the time of invention, it would have been obvious to a person of ordinary skill in the art to design the battery charger to cease charging when the charging current becomes lower than a predetermined value so that it does not overcharge and destroy the battery.

**Regarding claim 7,** Oyamada does not disclose resuming charging of the second battery until the charging current of the second battery is less than a limit current indicating a state of full charge. Fujii discloses in column 11 lines 20 thru 51 that the battery is continuously charging until it reaches a charging current ratio of 90%. Fujii further discloses in column 11 lines 52 thru 57, that the controller uses this percentage of charging current to determine stop charging of the battery. At the time of invention, it would have been obvious to a person of ordinary skill in the art to design the battery charger to cease charging when the charging current becomes lower than a predetermined value so that it does not overcharge and destroy the battery.

**Regarding claim 8**, Oyamada disclose the invention as defined in claim 5, but does not disclose wherein charging a first battery with a constant current until a charging voltage becomes a first reference voltage; charging a second battery with a constant current until a charging voltage becomes a second reference voltage; charging a third battery with a constant current until a charging voltage becomes a third reference voltage; charging a fourth battery with a constant current until a charging voltage becomes a fourth reference voltage. Fujii discloses in column 14 line 55 thru 66, that charging voltage is used to determine when to stop charging one battery and resume charging another. Fujii further discloses in column 12 lines 35 thru 39, that the aforementioned methods can be used if there are three battery packs or more. At the time of invention, it would have been obvious to a person of ordinary skill in the art to charge the batteries to a reference voltage so that overcharge is prevented and so that charging time can be decreased.

10. Claims 9 - 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyamada (U.S. 4,387,332) in view of You (U.S. 6,777,913).

**Regarding claims 9 – 10**, Fujii does not disclose the invention resuming charging of the second battery until a charging current of the second battery is less than a reference current. You discloses in column 4 lines 38 thru 50 that a dual charging operation where a battery unit current is checked periodically and another battery is charged when the current is less than threshold. It would have been obvious to a person having ordinary skill in the art to modify Fujii's charging method and monitor charging current in one battery unit and resume charging in another unit as taught by You in order to shorten charging time.



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11. Claims 11 - 13, are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyamada (U.S. 4,387,332) in view of Fujii (U.S. 6,160,377) as applied to claim 5, and further view of Kaite (U.S. 5,808,442).

**Regarding claim 11 – 13,** Neither Oyamada nor Fujii explicitly disclose the reference values used for charging. Kaite discloses in column 2 lines 55 thru 61 that the batteries are charged with a constant voltage to 80% of the full charge. Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. At the time of invention, it would have been obvious to a person of ordinary skill in the art to set the reference voltage from 70% to 80% so as to prevent the battery from being overcharged.

12. Claims 15 – 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaite (U.S. 5,808,442) in view of Tamai (U.S. 5,637,979).

**Regarding claim 15,** Kaite discloses the invention as defined in claim 14, but does not disclose wherein said charging voltage/current characteristic has one of a voltage gradient and a current gradient according to a charging voltage/current of said first battery. Tamai discloses in figure 9 a graph showing voltage and current characteristics having a voltage and current gradient according to the charging of the first battery. At the time of invention, it would have been obvious to a person of ordinary skill in the art to find the voltage and current gradient because it provides important information about the battery's performance.

**Regarding claim 16,** Kaite does not disclose wherein said voltage of said first battery gradually rises, said current goes to a constant current then said current gradient goes to substantially zero, thereby said voltage of said first battery having a predetermined gradient, and wherein when said first battery is charged by some degree of charging, said current drops, said current gradient has a negative value, and then said first battery has a constant voltage zone, thereby said voltage of said voltage being substantially zero. Tamai discloses in figure 9 a graph showing wherein the voltage gradually rises, the current goes to a constant current and then the current gradient goes to substantially zero, thereby said voltage of said first battery having a predetermined gradient and wherein when said first battery is charged by some degree of charging, said current drops, said current gradient has a negative value, and then said first battery has a constant voltage zone, thereby said voltage of said voltage being substantially zero. At the time of invention, it would have been obvious for the Kaite charging system to implement Tamai's system because it provides accurate information of the rates of charging the battery, which is necessary to optimize charging performance.

**Regarding claims 17 – 18,** Kaite does not disclose the method wherein said first charging voltage/current characteristic, said voltage gradient is more than zero and a charging voltage has a reference of approximately 4.0 V and wherein a charging current has references of approximately 100mA and approximately 200mA. Tamai discloses in figure 9 wherein said first charging voltage/current characteristic, said voltage gradient is more than zero, which shows that there is an increase in charging, but does not disclose wherein a charging voltage has a reference of approximately 4.0 V and wherein a charging current has references of approximately

100mA and approximately 200mA. At the time of invention, it would have been obvious to a person of ordinary skill in the art to have the voltage gradient to be more than zero so that the voltage rate of charge increases, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

**Regarding claim 19**, Kaite does not disclose wherein said first battery charging said voltage gradient of said first battery is not more than zero, and a charging voltage of said first battery is not more than approximately 4.0V, and wherein if said voltage gradient is not more than zero and said charging current is not more than approximately 100mA and not less than approximately 200mA, then said first battery is charged and said second battery is not charged. Tamai discloses in figure 9 wherein said first battery charging said voltage gradient of said first battery is not more than zero, which shows that there is an increase in charging, but does not disclose wherein a charging voltage of said first battery is not more than approximately 4.0V, and where in if said voltage gradient is not more than zero and said charging current is not more than approximately 100mA and not less than approximately 200mA. For examination purposes, the charging current is interpreted to be "not less than 200mA." At the time of invention, it would have been obvious to a person of ordinary skill in the art to have the voltage gradient to be more than zero so that the voltage rate of charge increases, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

**Regarding claims 20 – 23,** Kaite does not disclose the wherein said second battery charging, said voltage gradient of said second battery is more than zero, and a charging voltage of said second battery is not more than approximately 4.0V; and wherein if said voltage gradient is not more than zero and said charging current is not more than approximately 100mA and not less than approximately 200mA, then said secondary battery is charged and said first battery is not charged. Tamai discloses in figure 9 wherein said second battery charging, said voltage gradient of said second battery is more than zero, which shows that there is an increase in charging, but does not disclose a charging voltage of said second battery is not more than approximately 4.0V; and wherein if said voltage gradient is not more than zero and said charging current is not more than approximately 100mA and not less than approximately 200mA, then said secondary battery is charged and said first battery is not charged. At the time of invention, it would have been obvious to a person of ordinary skill in the art to have the voltage gradient to be more than zero so that the voltage rate of charge increases, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

**Regarding claim 24,** Kaite does not disclose wherein in said first battery charging, a voltage and a current are an initial rising voltage and an initial constant current applied to said first battery, respectively. Tamai discloses in figure 9 wherein the applied charge to the first battery is an initial rising voltage and an initial constant current, so that an overcharge of current is prevented and the voltage is regulated to a certain level. At the time of invention, it would have been obvious to a person of ordinary skill in the art to implement the first battery's charging as a rising voltage

and a constant current so that an overcharge of current is prevented and a simpler method regulating the voltage is provided.

13. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art in view of Fiebig (U.S. 5,539,297).

**Regarding claim 25,** The prior art figure 5 discloses a first circuit to apply least one of constant voltage and constant current to a first battery; a second circuit to apply at least one of constant voltage and constant current to a second battery. The prior art figure 5 discloses the invention as defined, but does not disclose a control circuit to control operations of the first circuit and the second circuit such that the first battery and the second battery are alternatively charged and such that the first battery and the second battery is charged based on charging voltage/current characteristics of the second battery. Fiebig discloses in figure 1 item 5, a control circuit that controls operations of the first circuit and second circuit. Fiebig further discloses in figure 2 a graphical illustration of the charging sequence showing that they are alternately charged. Fiebig discloses in column 3 line 52 and in column 4 lines 19 thru 22 that current and voltage are detected and measured then batteries are charged in response to the given parameter. At the time of invention, it would have been obvious to a person of ordinary skill in the art to design the control circuit to control operations of the first and second circuit and alternately charge the batteries based on charging voltage/current characteristics because it is a safer mode of charging and ensures a shorter charge time period.

14. Claim 26, 27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art in view of Fiebig (U.S. 5,539,297) in further view of Kaite (U.S. 5,808,442).

**Regarding claim 26**, the prior art and Fiebig do not disclose wherein the charging voltage/current characteristics relate to a reference voltage. Kaite discloses in column 3 lines 34 thru 41 using a reference voltage as a charging characteristic to give priority to batteries, because the voltage level can provide important information on the state of health and capacity of battery. At the time of invention, it would have been obvious to a person of ordinary skill in the art to use voltage a charging characteristic because the voltage can provide information on state of health and capacity of the battery.

**Regarding claim 27**, the prior art and Fiebig do not disclose wherein said reference voltage is between approximately 80% of a full charge. Kaite discloses in column 3 lines 34 thru 41 that batteries are charged to a reference level, so that the battery is not overcharged with voltage. Further it has been held that when the general conditions of a claim are disclosed in the prior art, it is routine in the art to discover an optimum range. *In re Aller*. 105 USPQ 233.

**Regarding claims 29 – 30**, the prior art and Fiebig do not disclose wherein said current is a current value at a time of approximately 80% of a full charging voltage. Kaite discloses in column 2 lines 55 thru 61 that the batteries are charged with a constant voltage to 80% of the full charge. Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. At the time of invention, it would have been obvious to a person of ordinary skill in the art to set the reference voltage from 70% to 80% so as to prevent the battery from being overcharged.

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15. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art in view of Fiebig (U.S. 5,539,297) in further view of You (U.S. 6,777,913).

**Regarding claim 28**, the prior art and Fiebig do not disclose wherein the charging voltage/current characteristics relate to a reference current. You discloses in column 4 lines 44 thru 50, that a reference current value is used to end charging of the system, so that it adequately supply charging power to the battery. At the time of invention, it would have been obvious to person of ordinary skill in the art to use current as a reference because it can be used to adequately supply charging power to the battery so that it is not over charged.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexis Boateng whose telephone number is (571) 272-5979. The examiner can normally be reached on 8:30 am - 6:00 pm, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Sherry can be reached on (571) 272-2084. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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AB

  
**Adolf Deneke Bernane**  
**Primary Examiner** 8/8/05